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ComEd

February 25, 1998
BW/98-0009

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C.

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted in accordance with the requirement of 10 CFR 50.73(a)(2)(iv), which requires a 30-day report.

This report is Number 98-001-00, Docket No. 50-457.

Yours truly,

for Timothy J. Tulon
Site Vice President
Braidwood Nuclear Station

TJT/JG/vak
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Encl.: Licensee Event Report
No. 457-98-001-00

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
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I.D.N.S. Resident Inspector

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1):	DOCKET NUMBER (2)	PAGE (3)
Braidwood Unit 2	05000457	1 of 10

TITLE (4) Unit 2 Reactor Trip as a Result of Troubleshooting Work Performed on the Digital Electro-Hydraulic Turbine Control System Without Adequate Processes to Control the Work

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
1	26	98	98	001	00	2	25	98	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1
POWER LEVEL (10)	100%

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(iii)	☐ 73.71(b)
☐ 20.2203(a)(1)	☐ 20.2203(a)(3)(ii)	X 50.73(a)(2)(iv)	☐ 73.71(c)
☐ 20.2203(a)(2)(i)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(v)	☐ OTHER
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)	☐ 50.73(a)(2)(vii)	
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(viii)(A)	(Specify in Abstract
☐ 20.2203(a)(2)(iv)	☐ 50.73(a)(2)(i)	☐ 50.73(a)(2)(viii)(B)	below and in Text,
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(ii)	☐ 50.73(a)(2)(x)	NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
James Meister, Engineering Manager	(815) 458-2801 Extension 2341

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
X	EH	N/A	Westingh ouse	N						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines 16)

At 21:53 on 1/26/98, the Unit 2 Reactor tripped as a result of a 2A Steam Generator Low Low Level. Operations personnel stabilized the Unit in Mode 3 in accordance with approved Emergency Operating Procedures and initiated a plant cooldown. All Engineered Safety Features (ESF) functioned properly and there were no safety consequences as a result of this event.

The Reactor Trip was caused by a misconfigured electronic circuit card in the Unit 2 Turbine Digital Electro-Hydraulic Control (DEHC) system. This card was installed during maintenance work in progress at the time of the trip. The misconfigured card caused an inappropriate DEHC Overspeed Protection Circuit (OPC) actuation signal that closed the turbine governor and intercept valves resulting in the Steam Generator Low Low Level and the Reactor trip. The Root Cause Investigation Team concluded that there was an inadequate process to adapt the generic replacement DEHC card and to ensure that it had the correct configuration prior to installation. Contributing causes included inadequate work processes used in the DEHC maintenance activities, limited available DEHC design information, and the failure to characterize the work as a high risk evolution. Corrective actions include process changes in the control of work for the affected department, development of methodologies to configure and test DEHC cards, and planned improvements in the quality and control of the DEHC design information.

This event is being reported pursuant to 10CFR50.73(a)(2)(iv), any event or condition that resulted in a manual or automatic actuation of any engineered safety feature (ESF).

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit(s): 2 Event Date: 1/26/98 Event Time: 2153 Hours
Reactor Mode(s): 1 Power Level(s): 100% RCS [AB] Temp./Press. NOT/ NOP

B. DESCRIPTION OF EVENT:

There were no systems or components inoperable at the beginning of this event that contributed to the severity of the event.

At approximately 08:30 on 1/26/98, a Braidwood Nuclear Operational Analysis Department (NOAD) Computer Engineer performed a daily routine computer check of the Unit 2 Digital Electro-Hydraulic Control (DEHC) system computer memory. The monitoring system is normally reviewed daily for abnormalities. During this check, NOAD noted an indication of a card failure in the Unit 2 DEHC cabinet.

NOAD and System Engineering determined that this card failure had no immediate adverse impact on DEHC because, by design, the card fails in a fail-safe condition. However, replacement of this card was deemed necessary because it provides critical DEHC status and some Turbine Protection functions. Manufacturer's instructions allow for replacement of this card with the DEHC on-line in either automatic or manual modes of operation. NOAD identified that this card has three functions:

1. Indicates failures within the Overspeed Protection Circuitry (OPC).
2. Provides power to light the "OPC Monitor", "OPC Pressure Transducer" and the "Megawatts Transducer Monitor" annunciator lights on the DEHC panel.
3. Sets the Load Drop Anticipator (LDA) circuit for closing the Governor Valves and Intercept Valves when the generator breaker opens.

NOAD prepared a work task under an open blanket work request for Unit 2 Computer Maintenance, WR 980001222. NOAD requested that a replacement card be sent from the central warehouse. From approximately 14:00 to 14:30, NOAD performed a detailed briefing for the Control Room Unit Supervisor (Senior Reactor Operator Licensed (SRO)) on the failed DEHC card and the planned repairs. The on-coming Unit Supervisor (shift 3) was also present during this briefing.

Shortly after the turnover meetings were completed and shift 3 assumed the unit, a pre-job briefing was held between the Shift Manager (SM) (SRO), Unit Supervisor (US), Unit Nuclear Station Operator Licensed (NSO), Administrative NSO, and the two NOAD engineers. The following items were covered in the pre-job briefing:

- NOAD advised the Shift Operations personnel that they planned to remove the identified card, replace its fuse and reinstall the card if functional. If the card was not functional, it would be replaced with a new card.

- NOAD advised Operations of the card's functions which were primarily providing light indications for the three identified indicating lights. NOAD explained that the two additional functions on the card would have no effect in the present operating condition (output breaker closed).

- NOAD stated that this identical card was removed, its fuse replaced, and the card reinstalled in 9/97 (following a lightning storm), with the DEHC controls in the automatic mode and with no effect on the operating unit.

- Operations and NOAD reviewed the applicable vendor manual, drawings and Braidwood Annunciator Response (BwAR) procedures.

- A plan was developed to establish communications between NOAD (in the Auxiliary Electrical Equipment Room) and the NSO who would be monitoring the governor valves. The NSO was to monitor the valve positions, specifically the #4 governor valve, and place DEHC in Manual if the valves began any unexpected movement.

Following the pre-job briefing, communications were established between the NSO in the Main Control Room (MCR) and the NOAD engineer at the DEHC panel in the Auxiliary Electrical Equipment Room. After receiving permission for each step from the NSO, NOAD defeated the card's outputs by placing the enable/disable switch to disable and removed the card. The evolution was performed according to the established plan with no unexpected results. NOAD inspected the card and found its fuse blown. After the fuse was replaced the card was bench tested. The fuse blew immediately after the card was energized. NOAD decided to replace the card rather than attempt a repair.

The NOAD Engineers reviewed the vendor manual and prints to determine an appropriate method of bench testing a replacement card. The new card was received and the Engineers began the bench test. The card was a generic card and it was not configured for the specific application. The card did not have the required Programmable Read Only Memory (PROM) chips installed. The Engineers removed all of the installed NAND (Not And logic function) chips, and individually reinstalled and correctly tested each of the NAND chips' output signals. After an acceptable bench test of all of the input and output signals, all of the NAND chips were reinstalled. Finally, the PROM chips were removed from the old card and installed on the new replacement card. The installed PROM chips were verified to be in their correct positions and in the proper orientations by both of the NOAD Engineers.

Operations held a second pre-job briefing for the reinstallation of the replacement card. The same basic plan which was used during the removal of the card was to be repeated including the contingency plan to have the NSO monitor the #4 governor valve for movement and take manual control, if necessary. After communications were established between NOAD and the NSO, and NOAD received permission to continue, the enable/disable switch was verified to be in the disable position and the card was successfully reinstalled. After again receiving permission from the NSO, the enable/disable switch was placed in the enable position. Two of the three annunciator lights that are powered by this card ("OPC Monitor" and "Megawatts Transducer Monitor") immediately illuminated. No changes were noted in the turbine generator controls or Unit operation.

The NOAD engineers returned to the MCR and discussed the unexpected results with Operating Shift personnel. NOAD stated that the annunciator lights could be indicative of an actual problem with the megawatt transducer. An actual problem with the megawatt transducer could have been present earlier but would have not been noticed since the failed card provides power to these annunciator lights. NOAD performed some non-intrusive computer checks of the DEHC system but could find nothing abnormal. After additional discussion with Operations, NOAD received permission to obtain an actual voltage reading of the megawatt transducer input signal to the DEHC cabinet.

A third pre-job briefing was held with Operating and NOAD. The contingency plan to have the NSO monitor the #4 governor valve for movement and take manual control, if necessary, was re-established. Following the briefing, communications were

reestablished between the Engineers in the Auxiliary Electric room and the NSO. NOAD took the voltage reading and determined that the voltage input was consistent with the load. Based upon these checks, NOAD determined that the problem was apparently in the replacement card and discussed their findings with the Operating crew. As a result, a decision was made to remove the card for additional testing.

Operations and NOAD held a fourth pre-job briefing during which they decided to use the same removal plan as previously used: to defeat the card's output using the enable/ disable switch and remove the card. Again, the contingency plan to have the NSO monitor the #4 governor valve for movement and take manual control, if necessary, was to remain in effect.

Upon reestablishing communications with the NSO and receiving permission from the NSO, NOAD placed the replacement card's defeat switch to the disable position. The NOAD Engineer immediately heard numerous relays actuating and returned the switch to the previous position (enable). The NSO stationed at the DEHC panel in the MCR observed the "OPC Monitor" and "MW Transducer Monitor" lights go out and looked down to verify the main turbine governor valves positions. He heard alarms and when he turned around he saw that a reactor trip had occurred. The NSO immediately hung up the phone and walked to the reactor panel to perform activities in accordance with Emergency Operating Procedures. The Significant Event Recorder (SER) printout showed that the Reactor tripped on 2A Steam Generator Low Low Level, at 21:53 on 1/26/98.

Operations placed Unit 2 in a stable condition in accordance with the Emergency Operating Procedures. All Engineered Safety Features (ESF) functioned properly during the event. Subsequently, cooldown of the Reactor Coolant System was initiated to stabilize the plant at 900 psig and 360 degrees Fahrenheit. The cooldown was to effect unrelated repairs in accordance with a pre-approved forced outage plan. Problem Identification Form (PIF) A1998-00306, "U-2 Trip From DEHC Card Repair" was generated to document the event.

Operations initiated a root cause prompt investigation to identify the cause(s) of the Reactor trip. Initial interviews were conducted with the NOAD and Operating personnel involved in the event and written personnel statements were obtained. The Shift Manager quarantined the DEHC panel to ensure the preservation of evidence.

A visual inspection of the panel on 1/27/98 identified no abnormal conditions with the exception of missing retaining screws on the replaced card and other cards installed in the panel. Although the retaining screws were missing, there was no observable contact between adjacent cards or their components. The card that had been replaced on 1/26/98 was removed from the cabinet. A visual inspection of the card, the card's connector socket, and the adjacent cards was performed to identify any abnormal conditions such as discoloration (as a result of potential overheating), loose components, or foreign material. No abnormalities were identified.

The replacement card was compared to the original card removed from the system. At this time it was noted that the original card had fewer NAND chips on it than the replacement card. The original and replacement cards had only 6 PROM chips installed in the available 8 PROM chip positions, PROM positions 2 and 6 were not used. The NAND gate chips associated with PROM positions 2 and 6 were not installed on the original card. However, NAND gate chips were installed in all of the available positions on the replacement card, including those associated with the vacant PROM positions.

The replacement card that was in the DEHC at the time of the trip was taken to Byron Station to be tested in a Westinghouse DEHC simulator. The card was installed in the simulator, emulating the exact steps that were followed when the card was installed in the DEHC panel at Braidwood. The DEHC simulator responded in the same manner as the DEHC system at Braidwood Station, which was to send a close signal to the Governor and Intercept Valves when the enable/ disable switch was returned to disable. The results of this simulation proved that the card was the cause of the Braidwood trip.

Analyzing the card circuitry and performing additional testing, the NOAD Engineers deduced that any NAND gate without an associated PROM chip would float high, thereby causing the associated card output to toggle low. The NAND gate array has several outputs tied together and the incorrect NAND gate configuration altered the logical outputs generated by the card. The Load Drop Anticipator (LDA) SET signal was altered due to the output of one of the unused NAND gates left on the replacement card. When the card's enable/disable switch was placed in the enabled position, the SET signal to the LDA flip-flop located on the adjacent card C1-H55 went to a logical true condition, meaning an Overspeed Control (OPC) actuation (close governor and intercept valves) should happen. The LDA flip-flop normally has a logical true for a RESET signal and a logical false for a SET signal. However, the unused NAND gates caused both SET and RESET signals to be simultaneously true at the LDA flip-flop when the card was enabled. Because the LDA flip-flop has a RESET over SET behavior, the LDA flip-flop remained in the RESET State with no OPC actuation.

Due to the fact that the card was not responding as expected, when the enable/disable switch was placed in the disable position prior to removing the card from the panel, the RESET signal cleared before the SET signal cleared. This caused the LDA flip-flop to toggle to the SET condition, triggering an OPC actuation and sending the subsequent close signal to the governor and intercept valves.

The Investigation Team concluded that the Reactor trip was caused by the misconfigured circuit card that resulted in a DEHC Overspeed Protection Circuit (OPC) actuation signal. This inappropriate signal closed the main turbine governor and intercept valves. This action caused a Low Low steam generator level and resulted in the trip.

The Team determined that the following recovery actions were required for restart:

1. Install missing retaining screws into the DEHC cards.
2. Adapt the replacement card to be a like-for-like replacement. Perform documented bench and DEHC simulator tests on the replacement card. Install and verify the correct installation of the replacement card.
3. Review testing performed in refueling outage A2R06 (September - November 1997) to confirm that any card configuration deficiencies would have been identified in the testing. Confirm that no other maintenance work was done on DEHC since A2R06.
4. Follow the normal startup procedure (BwGP 100-3) for the DEHC system during the restart.

All other proposed corrective actions identified by the Root Cause Team were discussed in a January 30, 1998 Team meeting. The Team concluded that the other proposed corrective actions are not applicable to the restart of Unit 2. The first three immediate corrective actions identified above were completed on February 2, 1998, and the fourth completed during restart.

This event is being reported pursuant to 10CFR50.73(a)(2)(iv), any event or condition that resulted in a manual or automatic actuation of any engineered safety feature (ESF), including the Reactor Protection System (RPS).

C. **CAUSE OF EVENT:**

Root Causes:
The Investigation Team concluded that the Reactor trip was a direct result of the misconfigured card that caused a DEHC Overspeed Protection Circuit (OPC) actuation signal. This inappropriate signal closed the main turbine governor and intercept valves resulting in a Low Low steam generator level and the reactor trip. The Team concluded that there was an inadequate process to adapt the replacement DEHC card and to ensure that it had the correct configuration prior to installation. Specifically, the misconfigured card resulted from an inadequate knowledge of this type of cards by the NOAD Engineers, a lack of written processes or procedures for customizing a generic card, and the lack of proper testing to ensure the replacement card was correctly configured.

The NOAD Engineers' lack of specific and detailed knowledge of these cards was the result of insufficient training provided the NOAD Engineers. The Engineers were attempting to use a NOAD DEHC training manual and the vendor manual instructions provided for testing the failed card. However, the instructions were generic in nature and could not be followed exactly as written. Instruction was provided in another section of the vendor manual to remove any NAND chips not associated with a PROM chip to avoid card output errors. Because this instruction was not in the testing section of the manual, and because of the Engineer's unfamiliarity of the entire manual, this instruction was missed. Because the vendor manual did not clearly define the configuration requirements for each card in the system, detailed circuit board level knowledge was required of the worker to prevent errors from occurring. Training specific to this activity was not available within ComEd.

There was no written process or procedure for customizing a generic card for a particular application. The process of customizing a generic card was assumed to be "Craft Capability" (i.e. ensure the replacement card exactly matches the original card). This assumption was not implemented correctly because neither Engineer considered it necessary to physically compare the two cards to each other with respect to NAND chip locations. The Engineers were not aware that the extra NAND gate chips could interfere with the operation of the card so the Engineers did not think it was necessary to ensure that the chip placements were duplicated.

The testing performed on the replacement card was inadequate. The testing performed by the NOAD Engineers during this event was a substitute for a complete functional test that could have been performed if a simulator was available. ComEd does have a Westinghouse DEHC simulator (at Byron Station) that could have been used to test the replacement card; however the Engineers thought that the bench tests they performed were adequate.

Contributing Causes:
A contributing cause for this event was the adequacy of the work processes used by NOAD personnel to perform the DEHC work. The work was performed under a Blanket work request with no detailed instructions to help ensure that the work was performed

correctly. Additionally, the use of the blanket work request reduced the amount of review that was required.

The Investigation Team determined that the informal control of NOAD work during this event was the normal way NOAD has worked at Braidwood. NOAD had historically operated separate from the Station line organizations and did not consistently follow the same procedural controls as Station departments. For example, Station procedure BwAP 1600-1, "Action/Work Request Processing Procedure", states that Blanket Work Requests allow for routine work to be performed. Contrary to this procedure, most NOAD work was performed under Blanket Work requests. The work performed on the DEHC system during the 1/26/97 event should have been processed under a normal work request with detailed work instructions.

A second contributing cause for this event was that NOAD relied on attempting to match the removed card to configure the new card. The available design information and the vendor documents used to perform the DEHC troubleshooting did not provide detailed configurations for each card.

The third contributing cause of the event was the failure of Operations and NOAD personnel to identify the activities as a high risk evolution. Operations personnel were led to believe the evolution was a low risk primarily because of the following:

- NOAD identified the work as a low risk trip activity and stated that the card essentially affected only light indication.
- NOAD stated that the activity was performed before (3 months ago, same unit, same card, same NOAD Engineer)
- The Westinghouse manual said that the card could be replaced on-line in manual or automatic DEHC operation modes.

The NOAD personnel believed the evolution was low risk primarily because of the following:

- The NOAD Engineer had removed the same card three months before on the same unit, replaced the fuse, and reinstalled the card successfully. This previous on-line evolution was performed following a test of the evolution using the DEHC simulator at Byron Station. The NOAD Engineers failed to recognize that the current evolution was different from that performed three months earlier (reconfiguring and testing a new card versus replacing a fuse and reinstalling the same card.)
- The Westinghouse manual said that the card could be replaced on-line with DEHC in manual or automatic modes. The Investigation Team determined that this statement may not account for failed components on a card. Potentially, a failed component could change a card's output to be different than the original design and cause a similar event.
- The interrelationships of this card in the entire DEHC circuit was not sufficiently understood to assess the card's effects on all DEHC functions.

The failed DEHC card was identified to be emergent work that needed to be performed as soon as possible. This resulted in the work being processed outside of the normal Work Scheduling Processes. Station procedures allow for emergent work to be authorized by the Shift Manager and performed without being scheduled by the Work Control department. The priority placed on replacing the failed card appears to be higher than it should have been. NOAD Engineers have an expectation to expeditiously fix any condition that is potentially risk significant. Operations personnel generally believe that known

DEHC problems increase the risk of a plant trip. These issues, and clear expectations for allowable emergent work, provided the impetus to replace the failed DEHC card.

D. ASSESSMENT OF SAFETY CONSEQUENCES:

There were no nuclear safety consequences as a result of this event. A plant trip from power is an anticipated operational occurrence. All Engineered Safety Features (ESF) functioned as designed. Had the event occurred under more limiting circumstances, i.e. significant equipment out of service or failures during the event which complicated the plant trip, sufficient equipment is required by Technical Specifications to ensure the fulfillment of the safety functions. This also ensures no adverse impact on the health and safety of the public.

E. CORRECTIVE ACTIONS:

- Immediate Corrective Actions:

In accordance with approved Operating procedures, Operations stabilized the Unit in Mode 3. Subsequently, operating temperatures and pressures were reduced to 900 psig and 360 degrees Fahrenheit. A root cause prompt investigation was initiated and a Event Response Team was established to separately identify the root causes of the reactor trip and to initiate all necessary repair and recovery actions. The DEHC panel was quarantined until an inspection by qualified personnel was arranged to ensure no evidence was inadvertently lost.

- Corrective Actions:

The replacement card was properly configured, tested in the DEHC simulator panel and replaced in the Unit 2 DEHC computer panel. It was determined that the work performed on the DEHC panel on 1/26/98 was the only work performed on the DEHC panel since the last Unit outage, A2R06. An evaluation was performed of DEHC testing performed during A2R06 to ensure the functions of all DEHC cards were adequately tested. This review ensured no latent similar errors were present in the DEHC panel. Additionally, maintenance reinstalled retaining screws on all of the circuit cards in the DEHC panels.

- Corrective Actions To Prevent Recurrence:

The Shift Operating Supervisor issued additional expectations for Operations personnel regarding control and authorization of work.

Corporate management has directed that NOAD will report to the Station's Maintenance Manager at all ComEd Stations. This action is expected to improve training and communication of station expectations and policy changes to NOAD personnel.

Braidwood Electrical and Instrument Maintenance Work Analysts have been made available to prepare NOAD work packages.

All replacement DEHC cards, including cards with replacement components, will be tested on a simulator prior to installation in the plant. A policy communicating this expectation will be instituted and tracked to completion by NTS item 457-180-98-SCAQ0000101.

Braidwood will establish an approved methodology for configuring and testing DEHC cards, and will require that cards be configured and tested in accordance with the approved methodology. This action will be tracked to completion by NTS item 457-180-98-SCAQ0000102.

Braidwood NOAD personnel will be trained on the approved methodology for configuring and testing DEHC cards stated in action item 457-180-98-SCAQ0000102. This training will be tracked to completion by NTS item 457-180-98-SCAQ0000103.

NOAD will perform corrective maintenance using approved work packages. Training regarding station management expectations has been completed.

Braidwood will evaluate the use of Blanket Work Requests at Braidwood Station and determine if the current policy is appropriate. This action will be tracked to completion by NTS item 457-180-98-SCAQ0000104.

A record will be created of the as-built DEHC card configurations. This action will be tracked to completion by NTS item 457-180-98-SCAQ0000105.

Braidwood will update appropriate vendor diagrams after the record of the as-built DEHC card configurations has been created (ref.: NTS item 457-180-98-SCAQ0000105). This action will be tracked to completion by NTS item 457-180-98-SCAQ0000106.

Braidwood will perform a review of systems similar to DEHC, for similar design documentation deficiencies to those identified in DEHC. This action will be tracked to completion by NTS item 457-180-98-SCAQ0000107.

Braidwood will determine the Vendor Technical Information Program (VETIP) requirements for NOAD DEHC training manuals, and other DEHC references, and implement additional corrective actions as determined appropriate. This action will be tracked to completion by NTS item 457-180-98-SCAQ0000108.

Braidwood will reassess for appropriateness the Westinghouse DEHC manual recommendations stating certain cards may be replaced on-line. This action will be tracked to completion by NTS item 457-180-98-SCAQ0000109.

The Braidwood Operations Training Advisory Committee will evaluate if additional DEHC system training, conducted with NOAD personnel, would be beneficial. This action will be tracked to completion by NTS item 457-180-98-SCAQ0000110.

Braidwood will assess the need for continuing training for NOAD personnel that includes hands-on troubleshooting situations. This action will be tracked to completion by NTS item 457-180-98-SCAQ0000111.

An Effectiveness Review, in accordance with NSWP A-16, will be performed on the completed corrective actions to prevent recurrence of this event. This action will be tracked to completion by NTS item 457-180-98-SCAQ00001ER.

F. PREVIOUS OCCURRENCES:

LER NUMBER **TITLE**

There have been no previous LERs that were determined to be caused by inadequate work processes or improper maintenance on the DEHC system.

G. COMPONENT FAILURE DATA:

MANUFACTURER	NOMENCLATURE	MODEL	MFG. PART NO.
Westinghouse	Programmable Logic Card	4NPL	2838A33G01

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9803030356 DOC.DATE: 98/02/25 NOTARIZED: NO DOCKET #
FACIL:STN-50-457 Braidwood Station, Unit 2, Commonwealth Edison Co 05000457
AUTH.NAME AUTHOR AFFILIATION
MEISTER,J. Commonwealth Edison Co.
TULON,T.J. Commonwealth Edison Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 98-001-00:on 980126,Unit 2 reactor tripped as result of 2A SG low low level.Caused by misconfigured electronic circuit card in Unit 2 turbine digital electro-hydraulic control sys.Operations stabilized.W/980225 ltr.

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NOTES:Standardized Plant. 05000457

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CATEGORY 1 DOCUMENT

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